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cont*

TiO₂ + ZrO₂ is at least 2.3 %

REMARKS

Claims 2, 4, 10 and 12 have been canceled. Claims 1, 3, 5-9, 11, 13-15 and newly added Claims 16-24 are active in the case. Reconsideration is respectfully requested.

Claim Amendments

The limitation of Claim 2 has been placed in Claim 1, as well as the limitation regarding TiO₂ and ZrO₂ from Example 10, 3rd column of the Table on page 18 of the specification. Support for the expressed exclusion of Bi₂O₃ from the oxides of the claim can be found in the examples of the specification where Bi₂O₃ is not shown as an oxide component of the glass. Also support for the new upper content limit for K₂O can be found in line 2 of page 10 of the text.

As to the matter of newly added Claim 16, support for the same can be found on page 7, lines 18-26 of the text. Support for newly added Claim 17 can be found on page 1, lines 19-22 of the text and original Claim 1.

Support for newly added Claims 18-22 is found in original Claims 2, 3, 6, 7 and 8 and support for newly added Claim 23 can be found in original Claim 9.

Support for newly added Claim 24 exists on the same basis of the amendments made to Claim 1 as detailed above.

None of the amendments to the claims and the newly presented claims raise an issue of new matter, and entry of the same is respectfully requested.

Prior Art Rejection

The present invention is directed to a silica-alumina based glass composition which is useful as a glass in the manufacture of a data storage medium such as a magnetic disc. As such, the composition of the invention consists essentially of 40 to 59 % SiO_2 , 5 to 20 % Al_2O_3 , 0 to 8 % B_2O_3 , 0 to 10 % MgO , 0 to 12 % CaO , 2 to 20 % SrO , 0 to 2 % BaO , 0 to 4 % ZnO , 0 to 2 % Li_2O , 0 to 10 % Na_2O , 0 to 8 % K_2O , 0 to 10 % TiO_2 and 0 to 5 % ZrO_2 , wherein $\text{MgO} + \text{CaO} + \text{SrO} + \text{BaO}$ is at least 15 %; $\text{Al}_2\text{O}_3 + \text{TiO}_2$ is at least 11 % and $\text{TiO}_2 + \text{ZrO}_2$ is at least 2.3 %, all amounts given in terms of percent by weight.

As to the matter of the rejection of the claims over the Kohli et al '152 patent, the same discloses a silica/alumina glass that contains a number of the oxide components of the presently claimed glass. However, the patent does not disclose TiO_2 as a glass component and further does not show or suggest the limitation of the claims of the sum of TiO_2 and ZrO_2 of at least 2.3 %. The patent does disclose ZrO_2 as a component of the glass broadly within the range of 0-5 % by wt but in the only example of a glass shown in Table 1 of the patent, Example 8 only shows a glass that contains ZrO_2 , and then only in an amount of 2 % by wt. Accordingly, the anticipatory ground of rejection is believed obviated and withdrawal of the ground of rejection raised under 35 USC 102 is respectfully requested.

The Clifford '516 patent discloses a SiO_2 glass that contains a plurality of oxide components, many of which are oxide components of the present glass. However, a significant oxide component of the glass of the patent is Bi_2O_3 which is broadly present in the glass of the patent in an amount ranging from 0 to 8 % by wt. Preferably, the glass of the patent contains from 1.0 to 4.5 % by wt, more preferably from 2.0 to 4.0 % by wt of bismuth oxide (col 5, lines 9-11). However, Bi_2O_3 is not a component of the present glass as claimed

as is clear from the expressed exclusion of the oxide from the composition of Claim 1. Also, the Clifford patent does not show or suggest the limitation of the present claims of TiO_2 and ZrO_2 of at least 2.3 %. Accordingly, the anticipatory ground of rejection raised under 35 USC 102 is obviated and should be withdrawn.

The Brix et al patent discloses an aluminosilicate glass for flat display devices. However, as disclosed, for instance, at column 4, lines 22-24, the K_2O content of the glass is high at >9 to 15 % by wt, which level of potassium oxide is significantly greater than the at most 8 % limitation for K_2O of the present claims. Accordingly, Brix et al does not anticipate the present claims and withdrawal of the rejection raised under 35 USC 102 is respectfully requested.

The Maeda et al '754 patent discloses a glass composition based on silica/alumina that again contains a number of the oxide components of the present glass. However, it does not show or suggest a glass that contains a sum of TiO_2 and Al_2O_3 of at least 11 % by wt, nor does it show or suggest a glass composition that contains 0-2 % by wt of BaO . Rather, the glass of the patent contains 0 to 13 % by wt BaO .

The Maeda et al '304 patent, like the '754 patent, discloses a glass composition based on silica/alumina that again contains a number of the oxide components of the present glass. However, whereas the present glass composition must contain a sum of TiO_2 and ZrO_2 of at least 2.3 % by wt, as disclosed in the patent, neither ZrO nor TiO_2 is an essential component of the disclosed glass (col 8, lines 7-14). Accordingly, the reference does not anticipate the invention as claimed and withdrawal of the rejection raised under 35 USC 102 is respectfully requested.

The Maeda et al '182 patent again discloses a glass composition based on silica/alumina that again contains a number of the oxide components of the present glass. However, the glass of the patent does not contain TiO_2 and therefore, as such, does not show or suggest the limitation of the present claims that the sum of TiO_2 and ZrO_2 must be at least 2.3 % by wt. Moreover, because the glass composition of the patent lacks a TiO_2 component, it also does not show or suggest a glass composition that contains a sum of Al_2O_3 and TiO_2 of at least 11 % by wt. Accordingly, the glass of the patent does not anticipate the glass of the present invention. Withdrawal of the rejection raised under 35 USC 102 is respectfully requested.

Double Patenting Rejection

Claims 1-15 stand rejected based on the judicially created doctrine of obviousness-type double patenting over Claims 1-9 of U. S. Patent 6,268,304 and Claims 1-4 of U. S. Patent 6,297,182. This ground of rejection is believed obviated by the filing of the attached Terminal Disclaimer which references both patents. Withdrawal of the rejection is respectfully requested.

Applicants hereby enclose copies of the assignments filed in the record of both U. S. Patents 6,268,304 and 6,297,182 which show that both inventions were commonly owned with the present invention at the time the present invention was made.

It is now believed that the application is in proper condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,

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MARKED UP COPY OF AMENDMENT

IN THE CLAIMS

Please cancel Claims 2, 4, 10 and 12 and amend Claim 1 as follows:

--1. (Amended) A glass for a substrate, which consists[, as represented by mass percentage,] essentially of:

in terms of weight percent

SiO₂ 40 to 59 %,

Al₂O₃ 5 to 20 %,

B₂O₃ 0 to 8 %,

MgO 0 to 10 %,

CaO 0 to 12 %,

SrO 2 to 20 %,

BaO 0 to 2 %,

ZnO 0 to 4 %,

Li₂O 0 to 2 %,

Na₂O 0 to 10 %,

K₂O 0 to [12] 8 %,

TiO₂ 0 to 10 %, and

ZrO₂ 0 to 5 %,

wherein MgO + CaO + SrO + BaO is at least 15 %;

Al₂O₃ + TiO₂ is at least 11 %;

TiO₂ + ZrO₂ is at least 2.3 %; and

Bi₂O₃ is not present. --

Please amend Claim 5 as follows:

--5. (Amended) The glass for a substrate according to Claim 3[4], wherein Li₂O + ZnO is at most 2 %.--

Please add the following new claims.

--16. (Newly Added) The glass for a substrate according to Claim 1, wherein CaO is substantially excluded from the components of the glass.

17. (Newly Added) A magnetic disc, which comprises:
an undercoat layer, a magnetic layer and a protective layer formed on a glass substrate,
which consists essentially of, in terms of weight percent:

SiO₂ 40 to 59 %,

Al₂O₃ 5 to 20 %,

B₂O₃ 0 to 8 %,

MgO 0 to 10 %,

CaO 0 to 12 %,

SrO 2 to 20 %,

BaO 0 to 2 %,

ZnO 0 to 4 %,

Li₂O 0 to 2 %,

Na₂O 0 to 10 %,

K₂O 0 to 12 %,

TiO₂ 0 to 10 %, and

ZrO_2 0 to 5 %,

wherein $\text{MgO} + \text{CaO} + \text{SrO} + \text{BaO}$ is at least 15 %.

18. (Newly Added) The glass substrate according to Claim 17, wherein $\text{Al}_2\text{O}_3 + \text{TiO}_2$ is at least 11 %.

19. (Newly Added) The glass substrate according to Claim 17, wherein $\text{BaO} + \text{Li}_2\text{O} + \text{Na}_2\text{O} + \text{K}_2\text{O}$ is at most 14 %.

20. (Newly Added) The glass substrate according to Claim 17, wherein $\text{Li}_2\text{O} + \text{ZnO}$ is at most 2 %.

21. (Newly Added) The glass substrate according to Claim 17, which has an average linear expansion coefficient of at least $70 \times 10^{-7}/^\circ\text{C}$ within a range of 50 to 350°C .

22. (Newly Added) The glass substrate according to Claim 17, which has a glass transition temperature of at least 600°C .

23. (Newly Added) A glass substrate made of the glass for a substrate as claimed in Claim 17, wherein the number of attachments having sizes of at least $10 \mu\text{m}$ present on the surface of the glass substrate held in a steam atmosphere at 120°C under 2 atm for 20 hours, is not more than $1/\text{cm}^2$, and the number of attachments having sizes ranging from $1 \mu\text{m}$ to less than $10 \mu\text{m}$ so present, is not more than $10^5/\text{cm}^2$.

24. (Newly Added) A glass for a substrate, which consists essentially of:

in terms of weight percent

SiO_2 40 to 59 %,

Al_2O_3 5 to 20 %,

B_2O_3 0 to 8 %,

MgO 0 to 10 %,

CaO 0 to 12 %,

SrO 2 to 20 %,

BaO 0 to 2 %,

ZnO 0 to 4 %,

Li₂O 0 to 2 %,

Na₂O 0 to 10 %,

K₂O 0 to 8 %,

TiO₂ 0 to 10 %, and

ZrO₂ 0 to 5 %,

wherein MgO + CaO + SrO + BaO is at least 15 %;

Al₂O₃ + TiO₂ is at least 11 %; and

TiO₂ + ZrO₂ is at least 2.3 %.--